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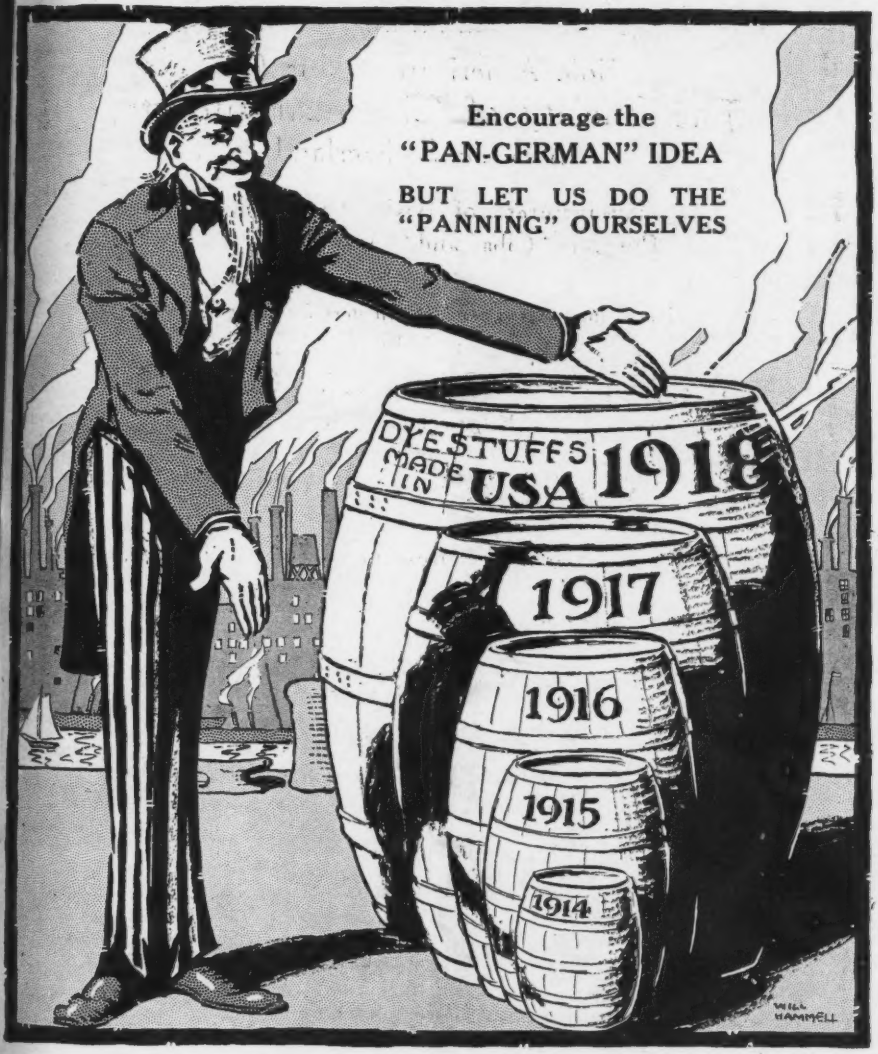

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BLACK BLUES KHAKI BROWN

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Specialty—Zeta Black for Hosiery

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Correspondence invited

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American Dyewood Co.

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Chipped *and* Ground Dyewoods

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Aniline Colors *and* Indigo

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Works: CHESTER, PA.

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IMMEDIATELY AVAILABLE

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As the leading American manufacturer of intermediates of the highest grade we occupy a most favorable position for the production of *first quality dyes.*

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Newport Benzo Purpurine 10 B
Newport Sulphur Navy Blue
Newport Sulphur Brown C
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Other products of equal and greater importance will be added as rapidly as produced.

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Newport Chemical Works, Inc.
PASSAIC, NEW JERSEY

Works: Carrollville, Wis.
General Offices: First Nat'l Bank Bldg., Milwaukee, Wis.

AMERICAN DYESTUFF REPORTER

A Weekly Publication devoted to

DYESTUFFS, COLORS and ALLIED CHEMICALS

"Circulated Everywhere Dyestuffs are Used"

Vol. 3 New York, July 29, 1918 No. 5

Encourage the "Pan-German" Idea

But Let Us Do the "Panning" Ourselves
What To Do If You Meet a German Spy

THANKS to the efforts of the Committee on Public Information and to the practically continuous fusilade of verbal warnings, graphic delineations and spirited denunciations, the consuming public is at last beginning to understand the real meaning of German propaganda. Perhaps the first-mentioned agency should have the lion's share of the credit, for through this, more than any other, has come the literature which has indicated clearly just what this oft-mentioned ogre is, and of what avail is it to denounce a thing to someone who wouldn't recognize that thing if they met it?

We must not forget, either, the splendid work done by numerous individuals who, before the establishment of the Committee, by their vigorous public utterances, which were subsequently quoted in the newspapers and the trade press, did so much to awaken in the powers that be the need for just such an organization. Often they were ridiculed, and sometimes, even, their very motives were questioned, but they fearlessly held to their self-appointed task and, by attracting the attention of others who assisted in spreading the gospel, became the center of a species of propaganda of their own making which did much to overturn the variety made in Germany.

The fact was that the public heard so much about "German propaganda" for a time that the word has actually almost lost its meaning for some who thought they knew what it was, and was ignored by those who never professed to know. They got it in the morning at the breakfast table, on the train, at the office and in the movies. They heard that it was "insidious," that it "spread all over the country like a huge, slimy octopus," whose tentacles reached gracefully into the innermost recesses of a man's mind and turned off the little dingus which controls normal thought. They gravely told each other that it must be counteracted, suppressed, crushed; that it must be ruthlessly stamped upon whenever and wherever it dared to show its ugly head. They heard it worked three shifts a day and never rested. The comic weeklies made them familiar with the picture of a German wearing an eighteen collar and a number six hat, the face adorned with horn-rimmed spectacles and a blond mustache of the walrus type, the hand holding a diminutive American flag, and a bomb protruding from the

hip pocket. But, of course, nobody ever actually *saw* such a thing, and nobody ever *heard* any German propaganda themselves, and hence, German propaganda eventually became something merely to warn others against. To them, the propagandist was someone who lurked around corners and sneaked up alleys in the dead of night, bent upon his nefarious and unspeakable missions, whatever they were. And, ye gods, how they hated him!

Those who have read Edward Everett Hale's story "My Double, and How He Undid Me," will recall how the hero, surfeited with public adulation and a plethora of speechmaking, hired another man who closely resembled him to dress in his clothes and deliver, in his head, an address which the hero was scheduled to make at a banquet. But as the double was an uneducated man and unable to deliver any sort of an address, he was simply charged to say, "Gentlemen: So much has already been said, and so well said, on this subject, that I fear I can add nothing to it," and sit down. The fiasco which ensued when the double chanced to be the first man called upon can well be imagined!

We also feel that so much has already been said concerning the subject of German propaganda as applied to the dye industry, that it almost borders on temerity to approach it again, and yet we believe that if only one more person can be made to understand how the most loyal and patriotic of men can themselves unwittingly become purveyors of the most successful sort of German propaganda, the space devoted to this homily will not have been wasted.

To begin with, we should like to get into the game and take our turn at attempting to define it. As we see it, German propaganda is *not* at all what Germans or German sympathizers say or do, but instead, what patriotic Americans often say or do in unguarded moments. Two examples will serve to illustrate what we mean by this.

Readers of the AMERICAN DYESTUFF REPORTER were recently told what the German color combine had to say about their confidence in their ability to regain their lost foreign trade. The very latest word regarding this comes from the pen of a German writer, Prof. Kurt Wiedenfelt, who claims to have made a special study of the subject. In an article in the *Finanstidende* (Copenhagen) received by the Bureau of Foreign and Domestic Commerce, Washington, he dwells at some length upon the certainty of renewed German domination of world trade, and "finds that Germans generally believe in the value of . . . their production of dyes and are placing much reliance in trade in these articles after the war." We know already that this is so, and one more repetition of the fact does not constitute so-called German propaganda. It is propaganda, right enough, but by itself would do no harm, and it is not what is meant by the term as it is now used. More than one loyal American has called attention to the seriousness of the outlook for the American dyestuff industry, once the German combine has a fair chance at it, without being accused of being the mouthpiece of Berlin. This sort of thing, on the contrary, is beneficial.

But it is the loyal American who reads these statements, begins to doubt the abilities of his country's manufacturers, begins to fear for the future, and eventually shakes his head sorrowfully and says mebbe they're right and you've gotta look out for yourself in this world and he's going to be on the safe side of the fence, who, especially if he is influential and has a wide circle of friends, does the real harm and becomes a starting point for rumors which, losing nothing by repetition, come at last to make for discouragement and a weakened morale. Remember, the newspapers always exaggerate things, and John Jones ought to know

what he's talking about, for hasn't he got a brother in the business!

Now for something more concrete. It was just about one year ago, after this country was successfully launched upon its war against barbarism, when a young man, speaking of trade publications in general and the probable effect upon their pocketbooks which their attitude towards the German color combine might produce after the war, said to the writer: "Watch your step. There are plenty of German dye firms in this country who will be ready to jump in the minute peace is declared. They aren't going to forget the magazines which 'panned' them when they make up their advertising appropriations, and they're going to spend millions. Take it from me, the less you say about crushing the German serpent, the better off you'll be in the long run."

The young man who said this is this minute in the trenches. He is personally known to the writer and is thoroughly patriotic. Yet here is the genuine article—German propaganda in its most characteristic form, and only that he was so very young he might have influenced many, for he had himself been strongly influenced by those older and wiser than he, and he followed almost blindly even while he gave utterance in the same breath to sentiments of a most patriotic nature.

He was ready to sacrifice his life, if necessary, to maintain his country's rights, but meanwhile, you just simply couldn't buck impossibilities, and that was all there was to it.

Nothing more need be said. Anyone can understand now what is meant by German propaganda, and the remedy is easy. One must give as much as he gets; the doctrine of pan-Germanism must henceforth be most heartily encouraged, and we must do the "panning" ourselves. We know that the dye industry of this country has got to survive, and after this is thoroughly understood everything becomes simplicity itself. Therefore, remember that optimism and ridicule are the two most effective weapons yet devised against the German idea, and the universal practice of these can do more to change our hopes into realities than whole pages beginning, "We view with alarm." Become a propagandist yourself, and force the German variety off the market. We have been burdened with it quite long enough.

BERLIN ANILINE DYE CO. REPRESENTATIVE INTERNED

Oswald Kunhardt, local representative of the Berlin Aniline Dye Works, with office at 124 Pearl Street, Boston, was yesterday, after leaving a train at Manchester, Mass., arrested under the alien enemy act. He was interned at the East Cambridge jail.

Owing to the lack of water in the rivers of North Carolina, 125 cotton mills in that state, supplied by hydro-electric power, were obliged to shut down for twenty-four hours last week. Over 3,000,000 spindles were rendered idle for the time being.

Frank Hemingway, Inc.
115 Broadway, New York

VICTORIA BLUE B
VICTORIA BLUE BASE
CRYSTAL VIOLET
CRYSTAL VIOLET BASE
CHROME BROWN
DIRECT BROWN RBR
ACID BROWN 3RR
MALACHITE GREEN
DIRECT GREEN GG
DIRECT ROSE
BENZYL CHLORIDE
PICRAMIC ACID
ORTHONITROPHENOL
PARANITROPHENOL
METAPHENYLENEDIAMINE
PARAPHENYLENEDIAMINE
PHOSGENE
SALICYLIC ACID

NATURAL DYES FROM THE PHILIPPINES

In a recent report the Philippine Bureau of Science states that probably more than a hundred species of plants containing valuable color principles are found in the islands, and many more could be readily cultivated. In most cases the colors produced are inferior in quality, being either fugitive or lacking in brilliancy. As the plants that yield dyeing materials grow wild and often are widely scattered, the supply is unreliable and insufficient. Little has been done towards developing the manufacture of local coloring materials, and until there is an intensive cultivation of the necessary plants, and the capital necessary for the enterprise can be secured, there is little prospect of commercial success.

Only two Philippine dye plants are commercially important. These are indigo and sappan or sibucao. Others are used locally, but scarcely enter into domestic commerce, much less into the external commerce of the Archipelago.

Sappan or sibucao is a shrub or small tree, widely distributed in the settled areas of the Philippines at low and medium altitudes. It is not systematically cultivated, but in a few districts, such as Guimaras Islands and parts of Panay, it is found in great abundance. In general, it appears only as a widely scattered tree. The wood is annually exported in considerable quantities to China.

Exports of sappan wood from the Philippines to China and Hongkong in 1914 amounted to 2,137,000 pounds, valued at $9,400.

The wood yields, an extraction with water, about 2 per cent of coloring matter, essentially the same as that obtained from the Brazil wood, Pernambuco wood, Lima wood and peach wood of South and Central America. All contain brazilin, $C_{16}H_{14}O_5$, closely related by constitution to haematoxylin. Brazilin is destitute of color but dissolves easily in alkalies, yielding a red solution. This, on exposure to the air, oxidizes to brazilin, $C_{16}H_{12}O_5$, which possesses vivid tinctorial properties. It is used to some extent in cotton dyeing and calico printing and occasionally on wool, chiefly in connection with other dyes. The brighter lakes with aluminum mordants find a limited use. The dye is quickly affected by light and washing. The extraction is not carried on in the Philippines, but in the countries importing the wood.

Indigo, locally known as tayum, tayom, tagum, pouay, tayum-tayum, and tagung-tagung, has been in the past extensively cultivated in some parts of the Philippines, and the prepared product entered extensively into the export trade. With the development of the coal-tar dye industry and the manufacture of artificial indigo, however, the production of indigo as a commercial crop in the islands practically ceased. It is still cultivated on a small scale in some parts of northern Luzon, but only to supply a limited local demand. It is highly probable that the extraction of natural indigo might be profitable at present, but the rehabilitation of the industry would take time and a considerable investment of capital in extraction vats. With the practical certainty that at the close of the war the industry would suffer from the competition of synthetic indigo, these seems to be no inclination to take risks.

Brown dyes are obtained from numerous plants, chiefly from the shrub or small tree known as bancudo or nino (Morinda indica, Linn.) certain of the mangrove trees, such as ceriops and bruguiera, the bark of xylocarpus (tabigue or nigui), and from numerous other less important sources. Bancudo is a well-known al dye of India. Cotton mordanted with tannin is colored dark red with this material.

Black dyes are secured from Herritiera litoralis, a common coastal tree, and from some species of Hibiscus, Semecarpus, Terminalia, and Diospyros.

The determining factor in most cases is the presence of tannin in large quantities.

Yellow dyes of minor importance are secured from the seeds of Bixa orellana (annatto); from the wood of nauclea (baucal); from Carthamus tinctorius (safflower) which is occasionally cultivated as a dye plant; from the bark of the common mango; from some species of Vitex (molave); and from ligtang, a woody vine having yellow wood rich in berberine.

NEW PUBLICATIONS

The Dyeing of Cotton Fabrics

"The Dyeing of Cotton Fabrics," by Franklin Beech, second revised edition, $4.00, published by Scott, Greenwood & Son, London, whose American agent is the D. Van Nostrand Co., New York, has just been published. The author is well-known and his books have had a wide and extensive sale among owners and managers as well as among dyers and finishers of textile mills. This edition is illustrated with forty-four engravings, contains about 300 pages with nothing eliminated from the first edition. The instructions for the use of each dye have been numbered and other improvements have been made to facilitate reference. It was the author's aim not to produce an elaborate treatise, but rather a book of convenient size in which the most modern processes have been described in detail, care having been taken to select those which experience shows to be thoroughly reliable and to give good results. This revised book is an important contribution to the dyeing literature of the textile industry.

The Cotton Mill Year Book

Something which should be in the possession of every mill man is the first number of the "Cotton Mill Year Book," which has just come to hand. This useful and convenient little volume contains in handy form much data of interest and should prove very serviceable to those connected with the industry. It was recently issued by the National Association of Cotton Manufacturers, who are planning to make its publication an annual event hereafter.

The Cotton Mill Year Book contains a section dealing with "The Development of the Cotton Trade in 1917," from the pen of Arthur Richmond Marsh, editor of the *Economic World*, that is a perfect mine of useful information, handily tabulated. There are also a number of statistical tables relating to raw cotton, a section devoted to technical tables used in the manufacture of cotton, and a large amount of engineering data. To all this is added a very complete "Buyer's Index," including all of the best known manufacturers of supplies used in textile mills. The price of the book to the public is placed at $1.50.

So far as we know, this is the first employers' association to publish a work of this kind, and judging from the work at hand the National Association of Cotton Manufacturers is doing the industry and the public a genuine service.

American Aniline Products, Inc.
80 Fifth Avenue New York
Factories:
Harrison, N. J. Nyack, N. Y.

Amanil Direct Colors
Amacid Wool Colors
Basic Colors
Sulphur Colors
ALIZARINE NAVY BLUE G
AMANIL VAT OLIVE

Southern Office:
Danville, Va.
New England Office:
87 Summer Street, Boston, Mass.

AMERICAN DYESTUFF REPORTER

Published weekly by
HOWES PUBLISHING COMPANY
470 Fourth Avenue, New York

Pointed solely toward the welfare and growth of the American Dyestuff Industry. Unbiased contributions appreciated.

A. P. HOWES, Editor and Publisher

Domestic Subscription, $3 per year. Foreign, $4.
Advertising rates on request.

THE RIGHT KIND OF ADVERTISING

British Dyes Limited is running in the British trade press a series of educational advertisements designed to impress upon the consuming public the essential necessity of developing and maintaining a domestic dyestuff industry completely self-contained from the production of crudes to the manufacture of finished products.

Their current advertisement, for example, reads as follows:

"In this, the sixth article of the series, the dominant principle controlling the policy of the company may once more be stated and emphasized, namely, that only by unlimited and cheap supplies of the materials from which the Fundamental Intermediate Products are manufactured, will it be possible to recapture for this country the Aniline Dye industry. It must also be clearly impressed on the public mind that this can only be accomplished by the establishment of large and complicated plants, not only for manufacturing the Fundamental Intermediate Products and the finished colors, but for the proper utilization of the by-products developed in the course of their manufacture.

"In the first four articles of this series we described certain Fundamental Intermediate Products, viz.: PARANITRANILINE BETA NAPHTHOL, BENZIDINE, H. ACID, and at this point it may be of interest to indicate by illustration how essential they are to color manufacture, and how varied and important are the colors controlled by them.

"Paranitraniline, which was described in the first article of the series, enters into the manufacture of a vast number of dyestuffs. When used for the production of Para Red it has enormous value for the dyeing of imitation Turkey Red on cotton by coupling it with Beta Naphthol, whilst when coupled with H. Acid and Aniline it produces the Acid Wool Blacks known as Naphthalene and Naphthol Blacks, colors which are used in enormous quantities in the dyeing of all classes of wool textiles. So adequate is our production of these Fundamental Intermediate Products that we are in a position to offer a full range of these Acid Blacks in unlimited quantities, a matter of real national importance in the prevailing conditions.

"H. Acid, described in our fourth article, enters even more extensively into the production of colors. For example, when coupled in the usual way with Paranitraniline, and then recoupled with Benzidine and the Sulphonic Acids of Naphthol, etc., it produces a great variety of Blue and Blue Black Direct Cotton Colors, some brands of which we are in a position to supply in any required quantity.

"These examples will give some idea of the importance of the four Fundamental Intermediate Products under review, and if there be used with them in addition—Aniline, Phenols, and Salicylic Acid, products which we shall have under review in the near future, we have a group of Fundamental Intermediate Products from which can be produced a great range of colors for the dyeing of wool, silk, cotton, linen, jute, etc.

"This indication of the importance of the Fundamental Intermediate Products will explain in some degree the policy of the company to ensure the production in quantities to meet all possible requirements, and the following incident in commercial history will serve to show that every effort must be made to secure the supply in the future. In order to establish a national industry, France in pre-war days imposed a tariff on imported dyestuffs, but practically no protection was given to

DU PONT AMERICAN INDUSTRIES

DU PONT DYESTUFFS

Explosives to Dyes

The evolution from explosives to dyes is the logical development of the dyestuff industry from both a chemical and engineering standpoint. The manufacturer of explosives enters upon the production of coal tar dyestuffs with these important advantages.

First, the explosives manufacturer starts with the necessary raw materials. In his munitions plants he produces the bases which are required. The immense output of his acid plants is at his disposal. In his chemical factories he manufactures many of his principal intermediates. He is therefore assured of sufficient quantities of the required ingredients—all products of this country—to meet his various needs.

He has at his command unequalled plant and laboratory facilities for the production and development of the intricate by-products of the coking industry, equally useful in the making of military high explosives and in the manufacture of dye intermediates and dyestuffs.

His chemical and engineering organization has had long training in the closely related explosives industry and is able through the experience gained, to overcome difficulties which would be insuperable to others less fortunately situated.

The high quality of his raw materials is guaranteed because they are made under his constant supervision and control and under the very exacting requirements of the explosive industry. He is consequently able to maintain, as no other manufacturer, the high standard of his finished product.

As the world's largest manufacturer of explosives the Du Pont Company enjoys these advantages to an unusual degree. It has already made possible the laying of a broad and secure foundation and the development of dyestuffs of the greatest commercial and industrial importance. It is the strongest guarantee of the permanency of our undertaking and of the final emancipation of the dyestuff industry from foreign domination.

E. I. du Pont de Nemours & Co.

Dyestuff Sales Department

Wilmington **ESTABLISHED 1802** **Delaware**

The Du Pont American Industries are:

E. I. du Pont de Nemours & Co., Wilmington, Delaware, Explosives.
Du Pont Chemical Works, New York, N. Y., Pyroxylin and Coal Tar Chemicals.
Du Pont Fabrikoid Co., Wilmington, Delaware, Leather Substitutes.
The Arlington Works, 725 Broadway, New York, N. Y., Ivory Py-ra-lin and Cleanable Collars.
Harrison Works, Philadelphia, Pa., Paints, Pigments, Acids and Chemicals.
Du Pont Dye Works, Wilmington, Delaware, Coal Tar Dyestuffs.

DU PONT

Fundamental Intermediate Products. As a result, Germany stopped exporting dyestuffs to France, but exported large quantities of the Fundamental Intermediate Products in such a state of completion as to enable them to be converted easily and cheaply into colors. By this policy they defeated the object aimed at by the tariff and prevented the dyestuff industry being established in France on anything approaching a national scale."

It seems to the REPORTER that advertising of this sort might properly be undertaken by some of the leading American manufacturers. It has all the distinctly commercial advantages to the firm sponsoring it which any form of advertising can have—it impresses the reader with the magnitude and scope of the manufacturer's operations and, because of its evident public-spiritedness, enlists his sense of patriotic loyalty, and, incidentally, offers the best sort of sales talk for his individual products.

But, in addition to the business-producing effect of such an advertisement for the individual firm which prints it, this class of advertising serves to acquaint the consuming public with the nature of the efforts which are being made by all manufacturers in common to meet the requirements of the national industry, and in this way encourages the cooperation of the consumer and serves as the best sort of counter-effective against all sorts of insidious German propaganda.

CHEMISTS TO DISCUSS WAR NECESSITIES AT CONVENTION

Thousands of chemists from all parts of the country are planning to come to New York City to attend the various conventions to be held by chemical and technical organizations in Grand Central Palace during the week of September 23. Coincident with these meetings will be held the fourth national exposition of chemical industries which promises to be the largest and most complete exposition of these industries ever held. In order to show the strides made by the chemists of America it will be necessary to use three floors of the Palace.

While the exposition will bring manufacturers of machinery, equipment, products and supplies together with men who are using them, its chief effect will be to show the people of the country that the chemists of America have made rapid advances the past year, greater than ever before in this country's history. Much of the success of winning the present war depends upon chemicals and the chemical engineer. The convention will bring to light some of the marvelous results of recent research, and many engineers and experts who hold important positions in the advance of the chemical industry will be speakers at the various industrial conferences. The proceedings will develop matters of timely interest to the public as well as to the assembled delegates.

The advisory committee of the exposition is composed of Charles H. Herty, chairman; Raymond F. Bacon, L. H. Baekeland, Ellwood Hendrick, Henry B. Faber, Bernard C. Heese, A. D. Little, W. H. Nichols, R. P. Perry, H. C. Parmelee, G. W. Thompson, F. J. Tone, T. B. Wagner and M. C. Whitaker. Charles F. Roth and F. W. Payne are the managers. Dr. Bacon of this committee is now head of the Chemical Warfare Section of the National Army and a member of General Pershing's staff.

The exposition is a war-time necessity and regarding it as such each exhibitor is planning his exhibit so that it will be of the greatest benefit to the country through the men who visit it, all of whom are bent upon a serious purpose—that of producing war materials in large quantities, and constantly increasing this production till the war has been won by the United States and its allies.

Papers covering practically every phase of chemistry and a discussion of steps that will need to be taken after the war, will be presented by leading experts in each branch. Pressing chemical problems concerning many of the chief articles of the domestic and foreign commerce will be taken up during the convention, and it is expected these

discussions will have an important bearing on the future manufacture of materials that have been scarce and high-priced ever since the curtailment of American commerce with Germany and other European countries. In order to fill the demands for chemicals hundreds of factories have sprung up in various parts of the country, and while doing a large business, it is pointed out by experts that there is a lack of preparation to meet new conditions which are bound to follow at the close of the war.

Exhibit of Dyestuffs in Worcester

The Dyestuffs exhibit of the National Aniline & Chemical Company, Inc., is now being shown at the C. T. Sherer department store in Worcester, Mass. The Sherer store makes the fourth stop for the exhibit, which was first shown at the Sixth National Textile Exhibition, Grand Central Palace, New York, and subsequently at the Jordan Marsh store in Boston, and the Arthur B. Little, Inc., laboratories in Cambridge. It will be displayed next at the store of B. Altman & Company, Fifth Avenue, New York, beginning August fifth, after which it will probably go further afield. Dr. Louis J. Matos, of the National Aniline & Chemical Company, has accompanied the exhibit on its wanderings, and has been ready at all times to explain any problems that arise in the minds of the visitors, or to give simple and comprehensive summaries of the dye situation to representatives of the public press. This policy it is the intention of the National Company to follow during the progress of the exhibit from place to place, which will continue as long as interest is shown on the part of the public in learning the story of American dyes.

Wanted—Diethyl Metaamidophenol

The REPORTER is in receipt of a request for information as to the availability in this country of Diethyl Metaamidophenol. Our inquiries so far have failed to reveal any manufacturer who is at the present time making this product. If any of our readers can give us information in this connection the courtesy will be appreciated.

After being in the hands of receivers for three-quarters of a year, the Federal Dyestuff & Chemical Co. has at last been completely reorganized as the Union Dye & Chemical Co., with Everly M. Davis as its president. The properties of the defunct concern were acquired for $1,000,000. The new company will spend $600,000 in plant expansion. The firm has government contracts to supply sulphur blues and khaki dyes.

FRED WETZEL & CO. N.Y.

ATLAS COLOR WORKS
INC.
BROOKLYN, N. Y.

Manufacturers of
Indigotine
Indigo Paste
Indigo Extract
Alizarine Yellow 3G
Malachite Green

We do not job in any colors, we manufacture

SALES OFFICE:
322 Ninth Street, Brooklyn, N. Y.
WORKS:
Hamilton Ave. and Gowanus Canal
Brooklyn, N. Y.

THEORIES OF DYEING DISCUSSED

At a recent meeting of the West Riding Section of the Society of Dyers and Colorists, England, a discussion on the theories of dyeing took place which should be of interest to our mill men. The discussion as printed in the *Journal of the Society*, follows:

Mr. W. Harrison, in opening the discussion, said that in the chemical theory of dyeing it is assumed that the wool or silk forms a chemical compound with the dyestuff. In the case of a basic dyestuff the basic portion enters directly into combination with the fibre, the acid originally in combination with the dye being left quantitatively in the bath (Knecht, *Journal of the Society*, 1888, p. 72).

By extracting wool dyed with basic color with alcohol Knecht (*Journal of the Society*, 1902, p. 103) obtained a product containing constituents of animal nature. He also found that the compound termed languginic acid, discovered by Champion, had the property of precipitating basic colors from solution.

In the case of acid colors Knecht found that dyestuffs of the same homologous series were absorbed by wool in proportion to their molecular weights. This relationship did not hold with dyestuffs from different series.

More recently Fort and others (*Journal of the Society*, 1915, p. 96) showed that under certain definite conditions the amount of sulphuric acid left free in the bath during the dyeing of an acid color, over and above that left when no dye was used, corresponded in molecular weight to the amount of dye absorbed. He also found that this relationship did not hold under other conditions of concentration (compare this *Journal*, 1915, p. 80).

The author has recently pointed out (*Journal of the Society*, 1918, p. 57) that these variations are met with in several cases of absorption (compare also Walker and Appleyard, *J. Chem. Soc.*, 1896, p. 1334).

The mechanical theory was based on the fact that substances of an indifferent nature, such as glass beads, kaolin, porcelain, and quartz could be dyed in a similar manner to fibres, only to a less extent. For example, glass beads were found to liberate free acid from basic colors.

Georgievics held that during dyeing the particles of dye become fixed on or in the fibres by adhesion, the latter being similar to capillary attraction. He stated that most cases of dyeing are in agreement with Henry's law, which states that the distribution of a substance between two solvents depends on the molecular weight of the compound in those solvents.

The surface tension or adsorption theory is a modification of the mechanical theory, and is based on the mathematical calculations of Willard Gibbs, who showed that substances which diminish the surface tension of water at the surface of contact with air or with another liquid become concentrated at that surface. He also calculated that this effect should diminish with rise in temperature, which is, of course, opposed to practical observation in the case of dyeing.

The formula usually applied to cases of adsorption is:—

$x/m = kc^n$ where x = quantity of substance absorbed by
m grams of fibre,
c the concentration of the solution at equilibrium.
k and n are constants.

This is an empirical law, and cannot be deduced from Willard Gibbs' calculations. It is very similar to the law applied to cases of solid solution.

In the electrical theory in its present state four factors are taken into account.

(1) The molecular movement of dyestuffs in solution, which gives rise to osmotic pressure phenomena—rise in

boiling point, lowering of freezing point, Brownian motion, etc.

(2) The electric charge on the dye and on the fibre.

(3) The surface of the fibre, including that within its pores.

(4) The size of the dye particles.

The molecular movement of the dye particles of ions enables them to get into contact with the fibre. This movement is accelerated or retarded according as the electric charges on dye and fibre are of opposite or of the same sign respectively. To obtain a resist the charges should be of the same sign and as large as possible, as instanced by the case of acetyl and nitrocellulose with direct colors.

The dye particles or ions when they arrive at the fibre may be held there by electrical attraction, as in cases where dye and fibre carry opposite charges, or by other means when the charges are of the same sign, as in the case of the dyeing of direct colors on cotton. In the last case the dye is coagulated on or in the fibre, because its electrical charge is neutralized by the oppositely-charged ions or water molecules immediately in contact with the fibre.

Mr. J. C. Oxley considered that the chemical theory explained the greatest number of dyeing phenomena.

Mr. G. G. Hopkinson said that Mr. Harrison appeared to consider that the "Electrical Theory" explained all dyeing phenomena, but whilst he felt that it was a very interesting contribution to the theories put forward for the elucidation of the problem, particularly in the dyeing of cotton, it did not appear to explain the whole phenomena. For example, it was generally accepted that hydrolytic dissociation sometimes took place. Would Mr. Harrison say that such dissociation could be explained by electrolytic action?

Further, the dyeing of wool with certain acid colors in a neutral, or even alkaline bath, apparently opposed Mr. Harrison's theory put forward to explain the dyeing of such colors on wool.

Mr. W. Harrison agreed with this, but pointed out that hydrolytic dissociation could be explained electrically as well as chemically.

Mr. F. Smith wished to know why certain dyes when applied to unions of wool and cotton produced a totally different color on each fibre, if a chemical action or the electrical theory was the cause? Again, which theory was accountable for wool dyed before long exposure being faster to milling than wool dyed after, when using certain acid milling colors, i. e., Patent Blue?

Mr. W. Harrison said that the cause of color was a different problem from dyeing, and one which might conveniently be discussed at another meeting of the Society. It was difficult to explain why exposed dyeings became faster to milling without further investigation.

Mr. G. Dougil suggested that as chemical reactions necessitated a change in energy, a means of determining the nature of dyeing was available.

Mr. W. Harrison said that electrical neutralization also produced a change in energy.

Dr. L. L. Lloyd asked how the dye-

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ing of certain cotton dyestuffs could be explained that were applicable from either acid, neutral or alkaline baths, and also why other direct cotton dyestuffs were best applied to wool from an acid bath.

Mr. W. Harrison stated that acids diminished the negative charge on both dye and fibre, and the retardation of the molecular motion by these charges was thus reduced, the dyeing being thereby assisted.

Dr. L. L. Lloyd pointed out that Chrysophenine, etc., could be dyed on wool from a neutral or an acid bath, giving shades fast to milling, whereas it would not dye to any appreciable extent from an alkaline bath. He could not understand why the dye, after converting into the sodium salt by the action of the alkaline milling solution, should remain on the fibre when the same color could not be applied from an alkaline bath. He was unable to offer a chemical explanation for this.

Mr. W. Harrison suggested that the acid in the dyebath produced a swelling of the wool fibre which enabled the dye to enter into it. The salt formed when the dyed wool was placed in an alkaline bath caused the swollen wool too shrink, thereby preventing the dye from getting out. Such swelling by acids and shrinking by salts has been shown by H. R. Procter to take place with gelatine.

Dr. L. L. Lloyd said that wool acquired an increased affinity for acid colors when treated with alkalis as well as with acids, and also by action of salts. Both alkalis and acids caused swelling in wool and other animal fibres, also many salts caused a breaking up of animal fibre substance, the dissolved bodies, when obtained by evaporation *in vacuo* or at low temperature, having all of the properties of gelatine. In the treatment of wool by acids or alkalis there is a marked development of the amido group in the wool (Fort and Lloyd, this *Journal*, March, 1914), this certainly affecting the dyeing of wool. Exposed wool has also the amido groups developed to a larger extent than unexposed wool, this most probably affecting the milling properties of many dyestuffs.

Mr. W. Harrison suggested that both the increased affinity for dyestuffs and the stronger test with reagents were due to increase in internal surface of the wool fibre. He pointed out that all the chemical reactions on which John Dalton based his theory were carried out in solution. With solid insoluble substances the surface exposed had to be taken into account in chemical reactions as well as in electrical interchange.

Mr. F. Smith wished to know why Indigo was faster to light when dyed on wool than it is when dyed on cotton. He thought that such a difference would not exist if chemical action did not play some part.

Mr. W. Harrison said that chemical reactions promoted by light would take place between compounds in contact in any way, whether chemically combined or not.

Mr. H. E. Wood argued that if the dye were fixed by electrical action it should be possible to strip it off by the same means.

Mr. W. Harrison said that this did not follow, because electricity supplied from an external source always went to the external surfaces of the charged object, and in case of a fibre in water the surface of the water and

In hoc signo vincimus

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the vessel containing it would receive the charge. The contact-electricity which caused dyeing was developed at the surface of contact between fibre and solution, the internal surfaces of the fibre acting in the same way as the external.

Mr. H. E. Wood also asked which theory chemical or electrical, would best explain the increased affinity for direct colors of cotton bleached in certain ways.

Mr. W. Harrison said that the chemical theorists had nearly all come to the conclusion that cotton dyeing was not a chemical phenomenon.

Mr. W. E. Tetley asked why ammonium sulphate could be used in place of sulphuric acid as an assistant to the dyeing of wool, and what electrical effect took place; he also asked why such a small amount was sufficient to cause complete exhaustion of the bath?

Dr. L. L. Lloyd argued that according to the electrical theory ammonium sulphate should act like sodium sulphate or potassium sulphate, because the positive ions carried the same charge. Potassium and sulphate, however, have very different action in the dye-bath. In his opinion it was yet too early to cling to one theory only to explain the dyeing phenomena. We know too little of the constitution of wool or other animal fibres, and until this is known it is unwise to overthrow any of the chemical theories. The example of the dyeing of quartz is not sufficiently comparative to use to explain a theory. In the dyeing of quartz it is necessary to force the dye liquor through the powdered quartz mass, but with animal, or even vegetable fibres, it is possible to prepare the fibre such that the dyeing will take place without any agitation.

Mr. W. Harrison thought that it was unlikely that ammonium sulphate would act like sodium sulphate, because the ammonium ion would undergo secondary ionisation, possibly giving a positively charged hydrogen ion. He imagined that ammonium sulphate would give wool a positive charge, but could not express a decisive opinion without making the necessary experiments. The difference between the dyeing of quartz and of wool he considered to be one of degree and not of nature. The forcing of the liquor through the quartz was merely an assistant in so far as it removed the products of interchange from the sphere of action. The same process also assists the dyeing of wool with the same dyestuff.

Dr. L. L. Lloyd pointed out that when ammonium sulphate or ammonium sulphate or ammonium acetate were used as assistants, both the acid and basic radicals were absorbed by the wool, whether in presence or absence of dyestuff in the bath.

In conclusion, Mr. Harrison pointed out that the electrical theory was in no way opposed to the chemical theory, but it provided explanations where the latter failed. The liberation of free acid from a neutral salt by negatively charged substances might be explained chemically when those substances were of acidic char-

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acter, as in the case of quartz and perhaps cellulose. In the case of colloidal metals, such as gold and platinum, any chemical explanation would necessitate making the assumption that any two metals could combine.

In the case of paraffin wax and anthracene, which also carried a negative charge, similar assumptions would have to be made. Mr. Harrison thought that very few orthodox chemists would agree to these assumptions, so that the electrical explanation must be considered as the only one acceptable at present.

NOTES OF THE TRADE

The presence of German dyestuffs aboard Dutch ships was sufficient to have a convoy to the East Indies stopped by Holland after Great Britain had raised objections, promising interference by warships. A Dutch White Book, just out, gives the facts.

William Ficker of New Orleans cliams to have perfected a dye-making process using the common or garden variety of weeds. According to Ficker, the American Indian was accustomed to daub his features with dyes of similar vegetable ingredients. The secret of making dyes from vegetable matter has been known to certain German scientists for years, he says. A group of New Orleans men have become interested in this new process, and have formed the Southern Chemical and Dye Company, with $150,000 capital, to manufacture and market the dye in powder form.

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From the Ordnance Division, War Department, Washington, D. C., the Butterworth-Judson Corporation, New York City, has received a contract to construct a $7,000,000 picric acid plant at Brunswick, Ga.

At the instance of the Jones & Laughlin Steel Co., the H. Koppers Co., Pittsburgh, Pa., will undertake the construction of a battery of 300 by-product coke ovens, with an annual capacity of 2,000,000 tons. The new plant will supply ammonium sulphate and toluol to the Government for war purposes.

A blaze which resulted in a loss estimated at over $20,000 visited the plant of the Westmoreland Chemical & Color Co., at Philadelphia, recently.

Announcement has been made through the New York office of the Lazard-Godchaux Co. of America, Inc., that the firm has opened a new office at 15 Rue Sully, Lyons, France. The office will be managed by Louis Destree, who will at the same time continue to direct the affairs of the firm's Paris office.

Standard Color Card Adopted

At an executive meeting of the Conference Council of Garment Wholesalers and Retailers, held July 10th, a resolution was passed which called for the adoption of the American Standard Color Card, issued by the Textile Color Card Association of the U. S., Inc.

The resolution also recommended to the participating associations that they in turn recommend the American Color Card to their members.

These Associations are: Cloak, Suit and Skirt Manufacturers' Protective Association; Dress and Waist Manufacturers' Association; Merchants' Ladies' Garment Association; National Retail Dry Goods Association; National Garment Retailers' Association; Retail Dry Goods Association of New York.

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Such problems are welcomed by the technical department of this company, which is manned by chemists who have been picked because of their knowledge, practical experience and demonstrated ability. We have long maintained well-equipped laboratories at our different offices for this purpose, and invite inquiries and extend, without any obligation on the part of our customers, our services to all who stand in need of them.

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